CLAIMS

What is claimed is:

1. A method for controlling an echo canceling system within a communication system, the method comprising the steps of:

detecting an occurrence of at least one of a transition from non-linear echo path to linear echo path and a transition from linear echo path to non-linear echo path;

halting a standard adaptation routine used to control at least one portion of the echo canceling system when occurrence of non-linear echo path is detected; and

initiating a prescribed logic routine to control the echo canceling system in place of the standard adaptation routine during the occurrence of non-linear echo path.

2. The method of claim 1, wherein the step of detecting an occurrence of at least one of a transition from non-linear echo path to linear echo path and a transition from linear echo path to non-linear echo path comprises performing at least one of a plurality of tests.

3. The method of claim 2, wherein a test of the plurality of tests comprises one of the group of tests comprising: detecting a presence of non-linear echo; checking a sufficiency of echo cancellation; determining a present error energy relative to a previous error energy; determining a strength of a desired signal energy; checking for a presence of weak echo; checking for echo canceller divergence; checking for a presence of strong echo; determining an amount of synthesized echo relative to a desired signal energy; and determining a transient state wherein synthesized echo exceeds a desired energy level.

4. The method of claim 3, wherein the test of detecting a presence of non-linear echo comprises testing at least one of: recent center clipping activity; error signal energy relative to a threshold and error signal energy relative to a desired signal energy.

5. The method of claim 3, wherein the test of checking a sufficiency of echo cancellation comprises testing at least one of error signal energy relative to a desired signal energy and a desired signal energy relative to a threshold.

6. The method of claim 3, wherein the test of checking for checking for a presence of weak echo and for echo canceller divergence comprises at least one of determining a magnitude of a square of a peak adaptive filter coefficient relative to a threshold; determining an error energy relative to a desired signal energy; and determining whether a desired signal energy is greater than a reference signal energy by a predetermined amount.

7. The method of claim 3, wherein the test of checking for the presence of strong echo comprises determining a reference signal energy relative to a first threshold and determining a desired signal energy relative to a second threshold.

8. The method of claim 3, wherein the test of determining an amount of synthesized echo exceeds relative to a desired signal energy comprises determining whether an error energy relative to a desired signal energy.

9. The method of claim 3, wherein the test of determining a transient state wherein synthesized echo exceeds a desired energy level comprises at least one of: determining a transition either into or from the transient state; determining a transition either into or from a transient state by checking whether an error signal energy relative to a desired signal energy; and checking a center clipping counter value.

10. The method of claim 1, the prescribed logic routine comprises at least one step of the group of steps comprising: determining a divergence state of the echo canceller; determining a desired signal energy relative to a reference signal energy; checking an error signal energy relative to a predetermined threshold; determining a strength of an error signal; checking a center clipper counter value; determining a presence of linear echo; checking a linear echo counter; determining a desired energy level relative a threshold; determining a sufficiency of echo cancellation in the presence of linear echo; determining a quality of echo cancellation and determining an echo canceller state.

11. The method of claim 10, wherein the step of checking a center clipper counter value comprises determining a center clipper counter is saturated.

12. The method of claim 10, wherein the step of determining a sufficiency of echo cancellation in the presence of linear echo comprises checking a desired signal energy relative to a threshold for a period of time.

13. The method of claim 10, wherein the step of determining the quality of echo cancellation comprises determining an error signal energy relative to a desired signal energy and determining the desired signal energy relative to a threshold.

14. The method of claim 10, wherein the step of determining a state of the echo canceller comprises at least one of the steps of: determining a desired signal energy level relative to a predetermined value, checking a value of a cancellation counter, checking whether a present error signal energy is greater than the desired signal energy level by a predetermined threshold and checking a state of a center clipping flag.

15. The method of claim 1, wherein the prescribed logic routine comprises at least one of the steps of: setting a center clipper state to ON, setting a previous error average energy equal to a present error average energy; incrementing a center clip counter value; setting a center clipper state to OFF; resetting a center clipping counter; setting a previous error average energy equal to a present error average energy; incrementing a center clip counter value; setting a transient counter value; decrementing a transient counter value; and saturating a center clipping counter.

16. An apparatus for echo canceling within a communication system wherein an echo generating system exists within the communication system introducing echo into a reference signal path, the apparatus comprising:

an echo canceller coupled to a desired signal path, the desired signal path including a desired signal and an echo signal generated by the echo generating system, the echo canceller including a first adaptation routine and a second adaptation routine an output signal for providing an output signal for canceling the echo signal from the desired signal path;

wherein the echo canceller is operable to detect an occurrence of at least one of a transition from non-linear echo path to linear echo path and a transition from linear echo path to non-linear echo path to halt operation of the first adaptation routine and to initiate

operation of the second adaptation routine when occurrence of non-linear echo path is detected.

17. The apparatus of claim 16, wherein the echo canceller comprises a plurality of tests, wherein the plurality of tests are selectively adapted to indicate a transition from linear echo path to non-linear echo path.

18. The apparatus of claim 17, wherein the plurality of tests comprise: detecting a presence of non-linear echo; checking a sufficiency of echo cancellation; determining a present error energy relative to a previous error energy; determining a strength of a desired signal energy; checking for a presence of weak echo; checking for echo canceller divergence; checking for a presence of strong echo; determining an amount of synthesized echo relative to a desired signal energy; and determining a transient state wherein synthesized echo exceeds a desired energy level.

19. The apparatus of claim 16, wherein the echo canceller comprises a comfort noise generator to provide a comfort noise signal, and wherein the output signal comprises the comfort noise signal.

20. The apparatus of claim 16, wherein the echo canceller comprises a synthetic echo generating system to provide a synthetic echo signal, and wherein output signal comprise the synthetic echo signal.